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gives the voice of the pig as *κοι*, or *kwee*: it may therefore be inferred, that in his day *ου* was pronounced *wee*, and *οικος*, *weekos*; but in spelling *week*, a modern Greek would be obliged to place a prefix to the ancient word, for instance, *ουοικ*.

Professor Peirce presented a communication from Mr. Safford on the mode of determining the places of planets, and one by himself on the personal peculiarities of astronomical observers.

On motion of Professor Parsons, it was voted that Mr. Safford's paper be referred to Professor Peirce for examination.

Dr. C. T. Jackson exhibited specimens of Tetradymite, or tellurid of bismuth, from Spottsylvania in Virginia; also an allied new mineral from Dahlonga, Georgia, viz. Bornit, with its composition and formula; he also exhibited gold from the same mine, in the matrix as well as washed, and gave an account of the gold-washing processes carried on in that State.

Four hundred and sixty-third meeting.

March 22, 1859. — SUPPLEMENTARY MEETING.

The PRESIDENT in the chair.

The Corresponding Secretary read letters from Sir William E. Logan, Montreal, March 7th, and from John Lindley, London, February 28th, in acknowledgment of their election, the former as Associate Fellow, the latter as Foreign Honorary Member of the Academy; also from William Sharswood, Philadelphia, March 17th, offering certain books for the acceptance of the Academy, and proposing certain exchanges.

The discussion at the last special meeting was continued by Dr. Charles Pickering, who read the following paper upon the subject: —

“Dr. Pickering had been practically engaged with the subject, in *ascertaining* the geographical distribution of species; had visited, and acquired local knowledge, at many different points of the earth's surface; and anywhere upon the planet would probably know his whereabouts by looking at the animals and plants.

“He regarded the subject as destined to throw light upon history ; but, as far as he was connected with it, instead of applying his experience, he had been called upon to impart it.

“He had constructed illustrative maps: yet, even with their aid, personal inspection seemed indispensable, extending to the species absent from a country, as well as those present. After various unsuccessful trials, he had adopted a plan of numbering the species geographically, according to the countries arranged in a particular order: the numbers will then supply the place of personal inspection, will point out where a genus or a species commences, and in a general way where it terminates: by following always the same conventional route, some idea of the distribution of species may perhaps be gained, without actual voyaging.

“In regard to the origin of species, Dr. Pickering’s observations have all tended to confirm an opinion he has long entertained. The term ‘local areas’ is, however, not his own; but seems preferable to that of ‘centres of diffusion,’ formerly used by him, and he will adopt the improvement. He considers, then, that *species originated upon local areas*; and are spread over as much of the earth’s surface as they have had a chance to reach and occupy.

“He regards the question as half decided by the fact, that very many species are confined to local areas to the present day; often, too, under circumstances that seem to preclude wider diffusion at any former period.

“1. The class Mollusca affords instances of the two extremes in diffusion; many of the land species being local, and many of the marine species widely diffused. At the Hawaiian Islands, each separate island has in a general way its own set of *land shells*; some species, at least, that do not reach the other islands of the group, nor reappear upon any other portion of the globe. While among the *marine shells*, he had himself seen living specimens of the *Cyprea tigris*, or leopard cowry, at the Hawaiian Islands, as at other points in the Pacific, and throughout the East Indian Archipelago and the Indian Ocean to the African coast, a distance from east to west of fifteen thousand miles. The explanation probably rests in the ova; those of the *Cyprea tigris* being marine, and preserving their vitality in sea-water, and those of the land mollusks perishing on immersion.

“2. The *Anseridæ*, or species of goose, are grazing birds, and, being

thickly coated with feathers, inhabit in preference chilly climates, arctic or else antarctic. The dreary summits of the Peruvian Andes are, however, inhabited by a peculiar species of goose; and another peculiar species occurs in the Hawaiian Islands, upon Mauna Roa, — only upon this one mountain, keeping amid or just above the zone of clouds, at the elevation of 6500 to 7000 feet, but visiting the country below, a small flock being often met with around the great crater. There are probably not more than three or four hundred pairs of this bird in existence; nor, perhaps, have there ever been at any one time; but commercial demand, should it ever arise, might in a few years multiply the pairs into millions, scattered all over the globe.

“3. The ocean-island of St. Helena is quite small, and its whole outer and lower portion is desert. On the very summit, comprising only five or six square miles of surface, some remarkable species of plants are growing, not to be found elsewhere. There seems no escape from the conclusion, that within this limited space on St. Helena the creative act has been exercised.

“This exercise of creative power took place many thousand years ago, as can be determined approximately. The *coral-islands* in the Pacific are many of them as widely insulated as St. Helena, and of larger area; but coming out of the water after the existing species of animals and plants had been created, too late for the visit of creative power, they contain no additional species. This, at least, is certain in regard to the low coral-islands: and as to the two or three minute land shells on the elevated coral-island of Metia, while so many rocky islands widely scattered around remain unexplored, it will not be safe to draw conclusions.

“That species continue unchanged in aspect during thousands of years, there is abundant evidence; — in the imbedded shells of these same coral-islands, for many ages above the waves, yet exactly similar to wave-washed living species close at hand; — in the animals and plants figured fifty-five hundred years ago on Egyptian monuments, in every instance identical with living species; — in the bodies of a variety of animals mummified in Egypt during the last three thousand years; — and in Gliddon’s mummy of a man who lived in the days of the prophet Elijah, showing that that generation did not differ physically from ourselves.”

The special subject for the evening’s discussion, namely, the Classification of the Animal Kingdom, as exhibited in the

palæozoic period, was next treated at length by Professor Agassiz.

In reference to Professor Agassiz's communication on the paleozoic animals, all of them aquatic, Dr. Pickering remarked, that the *oceanic animals* of the present day are almost as universally diffused as were those of paleozoic times. At least, a division into tropical and non-tropical will require the oceanic tropic to be placed full fifty degrees from the equator: there will then remain, outside of this belt of a hundred degrees, a few oceanic species that may be regarded as non-tropical.

Dr. A. A. Gould mentioned the fact that the land shells of the Sandwich Islands are peculiar in being distinct in their characters for each island: they are species of the genus *Achatinella*. The island of Metia has three species peculiar to it. The shells of the Feejee Islands do not resemble those of the Navigator's Islands, but are like those of the Society Islands, twenty degrees distant; a fact which Dr. Gould considered evidence of the former existence of an extensive continent now submerged.

Dr. Pickering said he did not think there was knowledge enough as yet of the shells of the Society Islands in the possession of naturalists to assert positively that the Metia shells do not exist on them. If this be really the case, it would be evidence of comparatively modern creation, as the island of Metia is a coral-island.

Professor Agassiz mentioned that even the fishes of different islands of the Sandwich group differ from each other, as had been proved by specimens in his possession.

Professor Gray, in a brief rejoinder to the remarks of Professor Agassiz upon his communication at a former meeting (p. 177), suggested that an obvious reason why the terrestrial species of the arctic regions were so generally alike round the world, while those of the temperate zone were less so, and those of the tropics mostly different, might be found in the geographical position of the regions in question, — the masses of land in the former being essentially contiguous, in the lat-

ter widely remote ; so that species might naturally have been diffused round the whole circumpolar regions, but this could not be expected in the widely separated tropical regions, except as to maritime species ; and, in fact, the strictly maritime plants were largely the same on both sides of the ocean. That is, the actual distribution was *as if* species had spread over as much of the earth's surface as they have had a chance to reach and occupy. Professor Gray, moreover, did not think that "the climate is the same" throughout the tropical regions of the two hemispheres, or comparable with the arctic regions in respect to uniformity, but he supposed that the great diversity of species in the former stands in relation to diversities of climate, station, and other physical circumstances, though these, of course, are not the cause of the diversity. Finally, the interposition in Western North America of a flora generally different from that of Japan and of Eastern North America, Professor Gray thought perfectly compatible with the theory of an interchange between the two last, since the line of dissemination must have followed the isothermals,—the curves of which appear to have been essentially the same in tertiary and post-tertiary times,—and therefore trended far to the north on the western side of the American continent, leaving the existing Oregon-Californian flora always as peculiar as now.

Dr. C. T. Jackson read an analysis of a specimen of Bornite from Dahlonega, Georgia, as follows :—

"Form, hexagonal plates, which split like mica, or molybdenite. Lustre, brilliant metallic ; color, between that of tin and polished steel ; flexible ; sectile ; hardness, $2\frac{1}{4}$; density, 7.868.

Results of Analysis of 1 Gramme.

Bismuth,		0.7908
Tellurium,		0.1800
Selenium,		0.0118
Gold (in fine scales),		0.0060
Loss,		0.0114
		1.0000

"This species has not been found heretofore in the United States, and is exceedingly rare in Europe."